

of material into and from a body of the vehicle during the haul cycle;

second means for sensing a parameter that varies during the haul cycles and providing a second set of data indicative of the parameter;

an electronic processing means on-board the vehicle for acquiring the first and second sets of data from the first and second means, processing the data to provide a third set of data which defines a haulage event executed by the vehicle during haul cycles [and organizing the first set of data to provide information regarding the execution of a haulage event of the vehicle]; and

a storage medium for accumulating the third set of data [information] from the electronic processing means so as to create a historical data base of the haulage events [as defined by the information].

2. (Twice Amended) The system as set forth in claim 1 [including second means mounted to the vehicle for providing a] wherein the second set of data is indicative of a direction of movement of the vehicle [and delivering the second set of data to the electronic processing means to be incorporated into the information].

4. (Twice Amended) The system as set forth in
claim [2 herein] 1 wherein the second means includes a
device for detecting a forward-neutral-reverse status of a
drive train associated with the haulage vehicle.

6. (Twice Amended) The system as set forth in
claim 5 wherein the first means includes a sensor for
detecting the raising of the body for unloading of the
material in the body [and providing a third set of data
indicative of the unloading to the electronic processing
means to be incorporated into the information].

7. (Twice Amended) The system as set forth in
claim 34 including a third means for [incorporating the
elapsed times of the haulage cycles into the historical
data base and a fourth means for] delivering control data
based on the third set of data [information] in the
historical data base for routing the vehicle to selected
locations.

8. (Twice Amended) The system as set forth in
claim [5] 1 including a third means responsive to the
electronic processing means for downloading the third set
of data [information] to a remote site which includes the
storage medium.

9. (Twice Amended) The system as set forth in
claim 8 wherein the remote site includes a central
electronic processing means responsive to the downloaded
third set of data [information] and the historical data
base of haulage cycles for providing [a third set of]
control data for use in directing a future operation of
the vehicle.

10. (Twice Amended) The system as set forth in
claim [9] 37 wherein the haulage vehicle is loaded by a
bucket of a loading equipment and the ~~electronic~~
processing means includes means for determining the weight
of each bucket in response to the first means and the
third set of data includes the weight of each bucket
[historical data base of haulage events includes an
average weight of a bucket over a plurality of loading
cycles for the loading equipment].

11. (Twice Amended) The system as set forth in
claim 8 wherein the haulage vehicle is loaded by a bucket
of a loading equipment, the [system] electronic processing
means including fourth means responsive to the first and
second sets of data for determining when material carried
by the bucket is loaded onto the body and incorporating
the determination into the information.

12. (Twice Amended) The system as set forth in
claim 11 wherein the electronic processing means includes
a fifth means [includes means] responsive to the first and
second sets of data for determining an elapsed time from
the loading of a first bucket in a load to the loading of
a last bucket.

13. (Twice Amended) The system as set forth in
claim 12 wherein the electronic processing means includes
a [including] sixth means responsive to the first and
second sets of data for recording the identity of the
loading equipment and providing information in the third
set of data associating the identity of the loading
equipment with the event [determination] of loading [when]
material held by the bucket into [is loaded onto] the
body.

15. (Twice Amended) The system as set forth in
claim 1 wherein the [including] second means monitors time
and the third set of data includes [mounted to the vehicle
for marking] the first set of data [from the first means]
marked with an indication of a time the first set of data
[is] was collected [and delivering the marked first set of
data to the electronic processing means to be incorporated
into the information].

18. (Twice Amended) The system as set forth in claim 1 wherein the [including second means for providing a] second set of data indicative is of the geographic location of the vehicle [and delivering the second set of data to the electronic processing means to be incorporated into the information].

20. (Twice Amended) A system for acquisitioning and accumulating data indicative of haul cycles [haulage events] executed by a haulage vehicle, the apparatus comprising:

first means mounted to the vehicle for providing a first set of data indicative of a loading of material onto a body of the vehicle during the haul cycle;

second means for providing a second set of data indicative of a relative time of the loading of the material sensed by the first means;

a electronic processing means on-board the vehicle for acquiring the first and second sets of data from the first and second means processing the data to provide a third set of data which includes an elapsed time associated with each haul cycle [and organizing the first and second sets of data to provide information regarding the execution of a haulage event by the vehicle]; and

a storage medium for accumulating the third set of data [information] from the electronic processing means

so as to create a historical data base of the elapsed
times [haulage events as defined by the information].

21. (Twice Amended) A system for acquisitioning
and accumulating data indicative of [haulage events] haul
cycles executed by a haulage vehicle having a pivotable
dump body, the system comprising:

first means mounted to the vehicle for providing
a first set of data indicative of a loading of material
onto [a] the dump body of the vehicle;

second means for detecting the pivoting of the
dump body into a dump position and providing a second set
of data indicative thereof [of the unloading of the
material by the body];

an electronic processing means on-board the
vehicle for acquiring the first and second sets of data
from the first and second means, processing the data to
provide a third set of data which defines a haulage event
executed by the vehicle during haul cycles [and organizing
the first and second sets of data to provide information
regarding the execution of a haulage event by the
vehicle]; and

a storage medium for accumulating the
information from the electronic processing means so as to
create a historical data base of the haulage events as
defined by the information.

22. (Twice Amended) A system for acquisitioning and accumulating data indicative of haul cycles [haulage events] executed by a haulage vehicle, the system comprising:

first means mounted to the vehicle for providing a first set of data indicative of a loading of material onto a body of the vehicle during a haul cycle;

second means for providing a second set of data indicative of a distance travelled by the vehicle;

third means for providing a third set of data indicative of a forward or reverse direction of movement by the vehicle;

a fourth means for providing a fourth set of data indicative of a relative time for each event recorded by the first, second and third means;

an electronic processing means on-board the vehicle for acquiring the first, [and] second, third and fourth sets of data from the first, [and] second, third and fourth means, processing the data to provide a fifth set of data which includes an elapsed time the vehicle is in each of the forward and reverse directions [and organizing the first and second sets of data to provide information regarding the execution of a haulage event by the vehicle]; and

a storage medium for accumulating the fifth set of data [information] from the electronic processing means

so as to create a historical data base of the first, second, third, fourth and fifth sets of data [haulage events as defined by the information].

23. (Twice Amended) A system for acquisitioning and accumulating data indicative of [haulage events] haul cycles executed by a haulage vehicle, the system comprising:

first means mounted to the vehicle for providing a first set of data indicative of a loading and unloading of material [onto] into and from a body of the vehicle during a haul cycle;

second means for providing a second set of data indicative of a geographic location of the vehicle;

an electronic processing means on-board the vehicle for acquiring data from the first and second means, processing the data to provide a third set of data which defines a haulage event executed by the vehicle during haul cycles [and organizing the data to provide information regarding the execution of a haulage events by the vehicle]; and

a storage medium for accumulating the information from the electronic processing means so as to create a historical data base of the haulage events as defined by the information.

24. (Twice Amended) A system for acquisitioning and accumulating data indicative of [haulage events] haul cycles executed by a haulage vehicle, the system comprising:

first means mounted to the vehicle for providing a first set of data indicative of a loading and unloading of material into and from [onto] a body of the vehicle;

second means for providing a second set of data indicative of an entity controlling the vehicle for each haul cycle;

an electronic processing means on-board the vehicle for acquiring the first and second sets of data from the first and second means, processing the data to provide a third set of data which defines a haulage event executed by the vehicle during haul cycles [and organizing the first and second sets of data to provide information regarding the execution of a haulage events by the vehicle]; and

a storage medium for accumulating the information from the electronic processing means so as to create a historical data base of the haulage events as defined by the information.

29. (Twice Amended) A system for tracking the time of a haul cycle for a haulage vehicle, the system comprising:

first means mounted to the vehicle for sensing the loading and unloading of a load carried by the vehicle and providing respective first and second sets of data in response thereto; [and]

second means responsive to the electronic processing means for creating a data base from the elapsed times of the haul cycles and processing the data base to derive control data for commanding the routing of the vehicle to selected locations; and

an electronic processing means on-board the vehicle responsive to the first and second sets of data indicative of the loading and unloading of the vehicle for determining the elapsed time of a haul cycle for the vehicle.

33. (Once Amended) The system as set forth in claim 1 including third means mounted to the vehicle for providing a [second] fourth set of data indicative of the stopping of the vehicle and delivering the [second] fourth set of data to the electronic processing means to be incorporated into the third set of data [information].

34. (Once Amended) The system as set forth in claim 1 wherein the third set of data includes [including a second means responsive to the information for determining] an elapsed time for a sequence of loading and

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unloading [haulage] events, which define [defining] a haul
[haulage] cycle.

35. (Once Amended) The system as set forth in
claim 8 including a fourth means for providing a [third]
fourth set of data indicative of the geographic location
of the vehicle and delivering the [third] fourth set of
data to the electronic processing means for inclusion in
the third set of data [remote cite].

Please add the following new claim:

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37. The system as set forth in claim 1 wherein the
first means includes a weighing device for continuously
monitoring the weight of a load of material.

REMARKS

In the Office Action mailed June 19, 1991, claims 1-
9, 11, 12, 15-29 and 31-36 were rejected under 35 U.S.C.
§103 as being obvious in view of any one of U.S. Patent
Nos. 1,261,508 to Gamble, 4,456,084 to Miller or British
Patent 2,043,921 to Griffiths taken in combination with
U.S. Patent No. 4,258,421 to Juhasz et al. The remaining
claims 10, 13, 14 and 30 were objected to as being
dependent upon a rejected base claim, but they were
indicated as being allowable if rewritten in independent